Perceptual Mapping between Arabic and English Consonants

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A learner’s native language (L1) has a great influence on his or her learning of sounds in a second language (L2). Several studies (e.g., Guion et al., 2000; Park & de Jong, 2008) have shown that perceptual category mapping between L1 and L2, which is not necessarily phonemic but phonetic mapping, provides an explanation on why some L2 sounds are more difficult to learn than others. In this study, therefore, we attempt to establish perceptual category mapping between Arabic and English consonants in the mind of native speakers of English, without any experience learning Arabic.

Native speakers of English, without any Arabic experience, participated in an identification task followed by a goodness-of-fit rating task. After listening to stimuli, the participants identified what they heard in terms of English labels. In addition, the participants rated how similar the stimuli were to the chosen English labels on a Likert scale from 1 (not similar at all) to 7 (exactly the same). A native speaker of Arabic produced the CV and VCV stimuli; consonants were fourteen Arabic consonants /t, d, ð, s, t, d, ð, s, q, x, ý, h, ʔ, ħ, ʕ, ʔ/ and vowels were six Arabic vowels /a a: i i: u u:/ Based on the proportions of the response labels and the goodness-of-fit ratings, we calculated a “fit index” to determine the mapping between the Arabic and English consonants. The identical tasks were also conducted with English stimuli. A native speaker of English produced the CV and VCV stimuli with eighteen English consonants /b, d, f, g, h, ŋ, k, l, m, n, p, r, s, t, z, θ, ð, ʔ/ and the vowels /ɑ i u/. The results for the English stimuli were needed to provide the baseline data to calculate the “fit index” (Guion et al., 2000).

The results indicate that first, Arabic consonants were mapped into English consonants with a corresponding or an adjacent place of articulation (e.g., English /h/ label for /ħ/). However, the manner of articulation did not necessarily agree in the cross-language mapping. For example, the most common label for /ʔ/ was not English /ʔ/ but /h/. Second, the degree of “fit” of Arabic consonants to English consonants differed. For instance, the Arabic consonants /t, d, s, s, h/ were a “good” fit to English /t, d, s, s, h/, respectively; yet, Arabic /q/ and /x/ were a “fair” fit to English /g/ and /h/, respectively. Third, some Arabic categories were mapped into more than one English category, whereas more than one Arabic categories were mapped into one English category. For such cases, the “fit” was not as good as the one-to-one (Arabic-to-English category) mapping cases. For instance, Arabic /q/ was mapped into either English /g/ or /h/ with a “poor” fit index; Arabic emphatic /t, d/ were mapped into English /d/ with a “fair” fit index. Fourth, the category mappings differed depending on prosodic location (i.e., onset vs. intervocalic) and vowel contexts (e.g., /a i u/). There was a greater consensus made with regard to the English label choices for the VCV/V:CV: stimuli than the CV:CV: ones. Our results will provide baseline data in order to generate predictions and explain difficulties that L1-English learners of L2-Arabic have in learning Arabic consonants.